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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,245	08/29/2001	Tongbi Jiang	2421.1US (99-0408.1)	8370

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EXAMINER

IM, JUNGHWA M

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/942,245	<b>Applicant(s)</b> JIANG, TONGBI	
	<b>Examiner</b> Junghwa M. Im	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 19-24, 26-41 and 44-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 19-24, 26-41 and 44-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8, 10-12, 14-16, 20, 21, 23, 24, 26-28, 30-33, 35-37, 39-41 and 45-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (US 5864178), hereinafter Yamada.

Regarding claims 1-3, 6-8, 10-12, 14-16, 20, 21, 23, 24, 26-28, 31-33, 35-37, 39-41 and 45-49, Fig. 58 of Yamada shows a semiconductor assembly comprising:

a semiconductor device (or a die; 201) having an active surface having a plurality of bond pads (224);

a substrate (202) having an upper surface having a plurality of circuits (202; a wiring circuit board);

a plurality of bumps (203) connecting said plurality of bond pads on said active surface of said semiconductor device to said plurality of circuits on said upper surface of said substrate;

said plurality of bumps forming a gap between said semiconductor device and said substrate;

an underfill material (an encapsulation resin; col. 56, lines 20-26) to fill the gap between said substrate and said semiconductor device (or between the substrate and the wetting agent layer);

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a wetting agent layer of about a monolayer thick, said wetting agent layer wettable by a polymeric material provided on the active surface of said semiconductor device and on a upper surface of substrate (col. 56, lines 22-63); and

said wetting agent including silane (col. 56, lines 29-63).

Regarding claims 5 and 30, Yamada discloses the wetting agent layer reduces surface tension of the active surface throughout the specification especially in col. 20, lines 34-65.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 9, 13, 19, 22, 29, 34, 38 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estes in view of Wong et al. (US 6180696), hereinafter Wong.

Regarding claims 4, 9, 13, 19, 22, 29, 34, 38 and 44, Yamada shows a substantially identical structure to the device of the pending claims except a specified wetting material. Wong discloses ethyltrimethoxysilane as a wetting material for an underfill process applied for a flip chip packaging. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching of Wong for the wetting layer of Yamada in order to have to good adhesion between chips and substrates, therefore reducing a surface tension in-between as taught in a portion of col. 15, lines 18-22 of Wong's reference.

***Response to Arguments***

Applicant's arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

In addition, Examiner would like to point out that claim 50 is not pending. Note that claim 50 has never examined with Applicant's consent since the claim limitation is identical to the non-elected claims 17, 18, 25, 42 and 43.

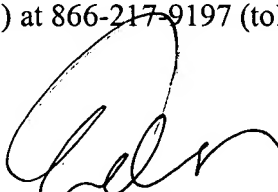
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jmi

  
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